

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Proposed Clarifications regarding Irregular Sub-frame	
Date Submitted	2008-05-05	
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Re:	IEEE 802.16m-08/016r1 (“Call for Contributions on Project 802.16m System Description Document (SDD)”)	
Abstract	This contribution proposes clarifications about the irregular subframe and its usage.	
Purpose	To be discussed and adopted by TGm in the 802.16m SDD IEEE 802.16m-08/003r1.	
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Proposed Clarifications regarding Irregular Subframe

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1 Introduction

The Draft IEEE 802.16m System Description Document (IEEE 802.16m-08/003r1, 2008-04-30 edition) includes description and diagrams to specify the irregular subframe and its usage. However, there are multiple problems with the current text. For example,

- 1) On page 17, in section 11.4.1, line 13 specifies an irregular subframe consists of five or less symbols, however, in Figure 9 on page 19, the irregular subframe, DL SF #4, appears as the same size as the regular subframes. In fact, it appears that the irregular subframe is *longer*, not shorter, than a normal subframe, because DL SF #4 is followed by a hashed rectangle that is not explained in the figure or text.
- 2) One end of the right dotted line of the irregular subframe in Figure 9 shows the grey-shadowed box is part of the irregular subframe, while the other end shows the opposite way; i.e., the grey-shadowed box is *not* part of the irregular subframe.
- 3) On page 22, lines 1 to 3 describe how the idle symbol is used to provide the needed gap at a switch point in TDD systems. In Figure 9, the irregular subframe is clearly used for this purpose. However, the explanation from page 22 needs to be moved to section 11.4.1, where the irregular subframe is introduced. Also, the definition and use of the irregular subframe needs to be explained and made consistent. Is it a shortened subframe, or a full-length subframe in which the last symbol is an idle symbol? And, if the definition in 11.4.1 is corrected to refer to idle symbols, then we need clarification as to *which* of the six symbols may be idled.

Obviously, some clarifications are needed regarding the irregular subframe and its usage. This contribution describes the proposed clarifications.

2 Proposed Clarifications regarding Irregular Subframe

First, let's start with the usage of the irregular subframe. Based on Figure 9 on page 18 and text in line 2 to 4 on page 22, the irregular subframe is used to provide the needed gap at switch points in TDD systems.

With such a usage of the irregular subframe, let's fix the inconsistency between Figure 9 and text in line 2 to 4 on page 22 by defining the irregular subframe as 6 symbols long but having one or multiple idle symbols at the end. In this way, the fixed interval of 0.617 ms, i.e., a subframe, is kept consistent in the frame structure. The irregular subframe is a special case of a subframe.

3 Proposed Changes in the Current SDD Draft 802.16m-08/003r1

Suggested change #1:

On page 17, change the sentence on lines 12 to 13 as follows:

There are two types of sub-frames: 1) the regular sub-frames which consist of six [active](#) OFDMA symbols and 2) the irregular sub-frames that consist of ~~five or less~~ [six](#) OFDMA symbols [in which one or multiple OFDMA symbols is idle, where the active OFDMA symbol is transmitted with modulated signals, and the idle OFDMA symbol is not transmitted](#) .

Suggested change #2:

On page 17, change lines 23 to 26 as follows:

Figure 9 illustrates an example TDD frame structure with DL to UL ratio of 5:3. Assuming OFDMA symbol duration of $102.82 \mu\text{s}$ and a CP length of $1/8 T_u$, the length of regular and irregular sub-frame are 0.617 ms ~~and 0.514 ms , respectively~~. In Figure 9, the last DL subframe, i.e., DL SF4, is an irregular sub-frame whose last OFDMA symbol is an idle symbol to accommodate the gap required to switch from DL to UL. Other numerologies may result in different number of sub-frames per frame and symbols within the sub-frames. Figure 10 shows the frame structure in FDD mode.

Suggested change #3:

On page 17, replace the Figure 9 by the following Figure:

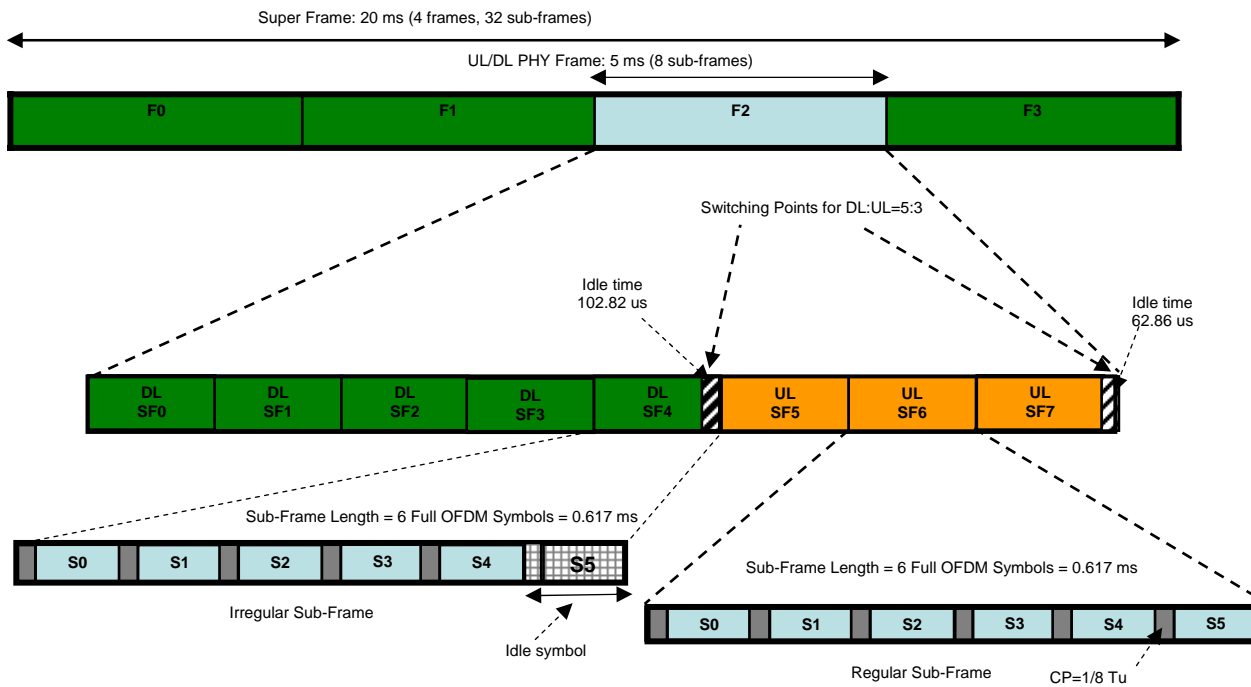


Figure 9: Regular and Irregular sub-frames in TDD duplex scheme (CP=1/8 T_u)